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Assistant Commissioner for Patents,
Washington, D.C. 20231,
on 1-8-97

TOWNSEND and TOWNSEND and CREW LLP

By Irene Rodas

PATENT

Attorney Docket No. 02307I-553

OFFICIAL

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	
MICHAEL D. DOYLE et al.	Examiner: D. Dinh JAN 08 1997
Application No.: 08/324,443	Art Unit: 2317
Filed: 10/17/94	RESPONSE AFTER FINAL
For: EMBEDDED PROGRAM OBJECTS IN DISTRIBUTED HYPERMEDIA SYSTEMS	

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

The following is responsive to the Office Action mailed December 13, 1996:

REMARKS

Claims 1-15 and 17-56 are now pending in the application. Reexamination and reconsideration are requested.

Claims 1 and 44 are rejected under 35 U.S.C. §103 as being unpatentable over Vetter "Mosaic and the World-Wide Web" and further in view of Hansen "Andrew as a Multiparadigm Environment for Visual Languages."

In claim 1, the distributed hypermedia document includes an embed text format that specifies the location of an object external to the distributed hypermedia document and that specifies type information utilized by the browser to identify and locate an executable application external to the distributed hypermedia document. The browser invokes the executable application to display and process the object within the browser window.

The Vetter reference states that "Users can extend Mosaic's functionality by creating custom servers and letting other applications control its display remotely."

The Hansen reference discloses a multiparadigm language environment for visual languages that supports not only graphical interaction but also file storage, printing, compilation, and execution. It is suggested that each sublanguage element be displayed in the same window.

The examiner states that Vetter discloses that Mosaic's functionality can be extended by having custom servers and letting other applications control its display remotely. Hence, it would have been obvious to extend Mosaic's functionality to enable external application to display and process the object within the browser-controlled window because it would have improved the system by reducing clustering of the display and aiding the reader comprehension of the hypermedia document. This rejection is respectfully traversed for the following reasons.

A Rule 131 Declaration is submitted showing that applicant's invention was reduced to practice prior to the publication of Vetter. Accordingly, the feature of controlling Mosaic's display remotely is not disclosed in the prior art.

Further, the feature described in Vetter was not present in Mosaic prior to the reduction to practice of the invention. The feature of remotely controlling Mosaic's display, the common-client interface (CCI), was incorporated into Mosaic based on the work done by the applicants as evidenced by Attachment I, a proposal to the NCSA, the developers of Mosaic, to modify Mosaic to allow real-time visualization tools to be embedded in Mosaic. (Michael D. Doyle, Ph.D.: Digital Libraries Proposal, 01/07/94, page 2 of 6 definition of IRV Server).

Accordingly, claims 1 and 44 are deemed allowable over the prior art.

Claims 2-5, 10-14, 24-27, 45-28, and 55 are rejected over Vetter in view of Hansen, and further in view of Filepp et al.

With regard to claim 2, the invention of claim 1 is further limited so that the executable application is a

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controllable application and includes the step of controlling the controllable application from said client workstation via communications sent over the distributed hypermedia network.

The disclosure of Vetter and Hansen is described above.

Filepp discloses the Prodigy system where a plurality of PCs are connected to a host server over the telephone lines and run software to receive and transmit data between the host and the PCs.

The examiner states that Vetter disclosed that Mosaic and the WWW currently lack direct support for application-specific data and support for controlling the presentation of nontext data and suggested letting other applications control Mosaic display remotely. This rejection is respectfully traversed for the following reasons.

As described above, the present invention was reduced to practice prior to the publication of Vetter and prior to the incorporation of the CCI in Mosaic. Accordingly, claim 2 is allowable because it depends on claim 1 which is allowable.

The disclosure of Filepp et al. is unrelated to Mosaic or the WWW and merely discloses a host/terminal network communication system.

The rejection of claims 3-5, 10-14, 24-27, 45-48, and 55 all rely on the teaching of Vetter and the feature of Mosaic of letting other applications control its display remotely. Because the present invention was reduced to practice prior to the publication of Vetter and the incorporation of the CCI in Mosaic, these claims are allowable over the prior art.

In view of the foregoing, Applicants believe all claims now pending in this application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at (415) 576-0200.

Respectfully submitted,

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Attachment I

NSF/ARPA/NASA Digital Libraries RFP Response

Title: A **Knowledge Managment Environment through the World Wide Web**

Principal Investigator: Michael D. Doyle, Ph.D., UCSF Library and Center for Knowledge Managment

Specific Aims:

1) To develop a prototype knowledge management environment for the biomedical sciences which integrates access to online representations of the scientific literature, bibliographic databases, high-performance visualization technologies, large-scale scientific databases, and tools for authoring new-generation scientific publications.

1.a) To explore and evaluate the applicability of these tools in the areas of radiology and developmental & molecular biology.

2) To provide a means for relating digital forms of spatial, functional, and conceptual information as a basis for linking the biomedical scientific literature, through the Red Sage electronic journals project, to data resources provided through the Visible Human Project, The Human Brain Project, The Visible Embryo Project, The Human Genome Project, The Protein Database, and other large-scale biomolecular and biostructural databases.

2.a) To exploit these linking strategies in the creation of a set of integrated semi-automatic front ends to varied scientific databases accessible through the Internet.

2.b) To incorporate these linking methodologies into interactive authoring and editorial tools, allowing the creation of online publications that can embed visualizations and simulations which draw data from these Internet-accessible scientific databases.

3) To develop tools which provide access to interactive visualization and analysis of massive biomedical datasets through the Internet's World Wide Web distributed hypermedia network.

3.a) To refine and extend our existing algorithms enabling distributed visualization and analysis software "engines" which can be efficiently accessed by remote users through the Internet.

3.b) To refine and extend our existing algorithms to allow the display and real-time interactive control of three-and four-dimensional data visualization and analysis tools within hypermedia documents viewed using NCSA's Mosaic graphical browser to the World Wide Web.

3.c) To develop algorithms which use novel compression technologies for the optimized interactive remote control of computationally-intensive graphical applications through the Internet.

3.d) To integrate a,b & c into a system which allows real-time remote access to distributed parallel computational applications for visualization and analysis resources within a distributed hypermedia environment.

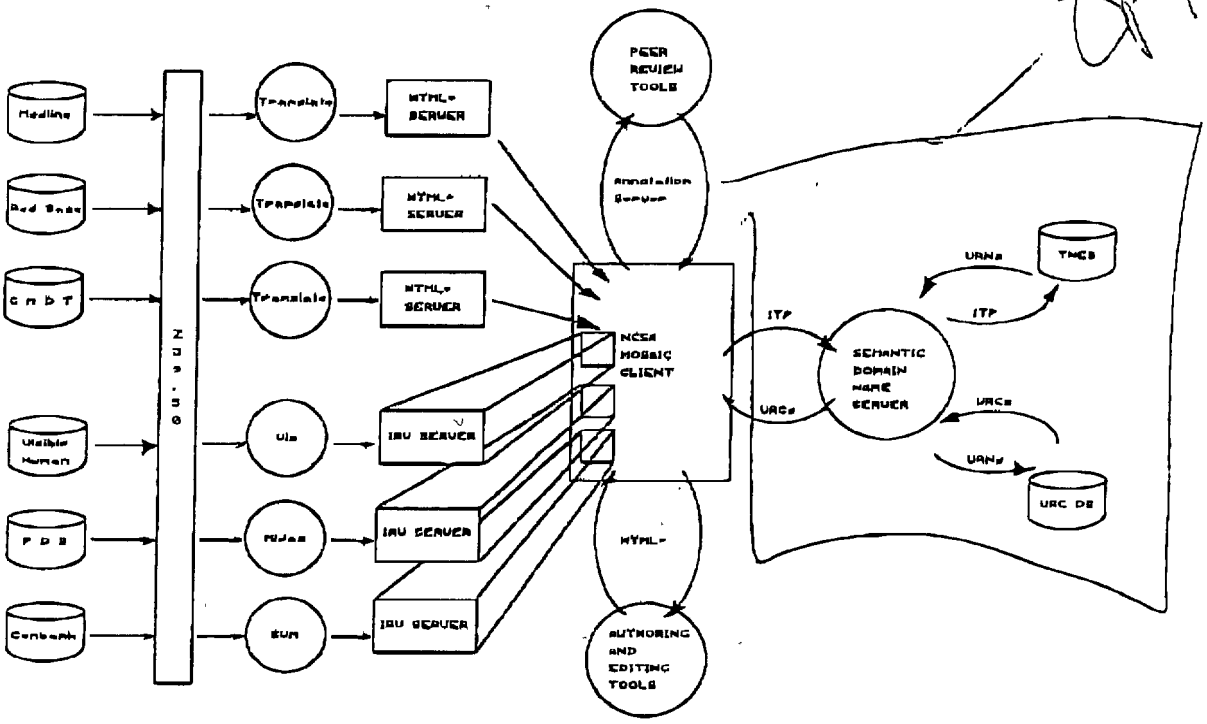
4) To explore extensions of the paradigm of scientific publishing which are made possible through use of current multimedia technologies in a networked environment, including:

4.a) publishing multidimensional datasets integrated with articles, eg: MRI and molecular data, perferred views, animations, interactive visualizations, interactive mathematical models, and

4.b) development of scientific authoring tools for publications which exist only in the networked environment.

4.b.1) This will include integration of HTML+ WYSIWYG authorial and editorial tools, multidimensional data visualization applications, molecular modelling and database management tools into an interactive scientific publishing environment.

System Diagram:



Definitions:

HTML+:	Hypertext Mark-up Language -- This is the language that World Wide Web databases are encoded in, and that Mosaic interprets.
IRV Server:	UCSF CKM's Interactive Remote Visualization Server -- This allows interactive real-time visualization tools to be embedded into Mosaic documents.
Vis:	UCSF CKM's distributed remote volume visualization tool
Midas:	UCSF CGL's molecular visualization package
SVM:	Sequence Visualization Module -- An as-yet unamed tool for graphical display of genetic sequence data.
ITP:	Informal Text Phrase -- A user-entered search term, or a word or phrase of text that the user highlights from within a document.
URN:	Universal Resource Name -- A persistent, location-independent identifier for an object.
URL:	Universal Resource Location -- The address of an object. It contains enough information to identify a communications protocol and retrieve the object.
URC:	Universal Resource Characteristics -- Any combination of one or more URNs or URLs with meta information (e.g. author, format, compression method).

Description:

The system will draw from of a number of fundamental databases including bibliographic data (Medline) in the form of MARC records, journal publication data (Red Sage) in the form of SGML header and Postscript files, encyclopedic reference text data (CMDT) stored in an object-oriented SGML database, volumetric anatomical data (Visible Human Project) stored as NCSA HDF datasets, protein structure data (Protein Data Bank) stored as PDB files, and genetic sequence data (Genbank) stored as compressed ASCII strings (?, I'm guessing about Genbank).

These databases will reside behind a Z39.50 interface layer which yeilds, to the requesting client, the respective dataset in its native form. This data then goes through a translation layer where the data is either translated directly into HTML+ (Medline, Red Sage, CMDT) or loaded into a native-data visualization tool (Visible Human, PDB, Genbank). The HTML+ code is then passed to a set of HTML+ servers, which can be browsed by the Mosaic client. The visualization data is handled differently. The graphical I/O of the relevant visualization tool is passed to an interactive remote visualization (IRV) server, which handles both mapping of the display output from the visualization tool onto embedded live-visualization windows within the Mosaic-browsable HTML+ documents, as well as capture of user-entered mouse and keyboard events within the visualization windows and transmission of those mouse and keyboard events back to the relevant visualization tools. The user, browsing the system with the project's enhanced version of the Mosaic client, is presented with data and visualizations derived from these various databases, yet embedded into coherent, multimedia Mosaic documents.

For multimedia documents that have been explicitly pre-composed, the linking of these various data resources can take the form of universal resource names (URNs) that are encoded as tags into the HTML+ documents. This is passed to the system's semantic domain name server, for resolution of the information object's location and retrieval means. The URNs are used as indices in order to look up the relevant universal resource characteristics (URCs) in a URC database, which yeilds the universal resource location (URL), or physical adress, of the information object in question.

Semi-automatic means will be provided for a user to search for arbitrary information objects on the system by either keying in a search word or phrase, or by highlighting a not-already-hyperlinked section of text that (s)he happens to be viewing within the Mosaic client at the time. This informal text phrase (ITP) is then passed to the semantic domain name server, which passes it on to a universal resource thesaurus (which will incorporate elements of the NLM's UMLS system). The thesaurus compares the ITP to its database of terms and phrases and returns a rank-ordered list of URNs that are likely to match the object in question. These URNs are then passed to the URC database for resolution of URLs that point to information objects on the Internet that are most likely to match the ITP that the user employed to initiate the search. The user is presented with a rank ordered set of textual descriptions of likely matches which are hyperlinked, via their URLs, to the data in question. Clicking upon a selection from this list loads the related data into the relevant visualization server (IRV) or HTML+ server, and a second Mosaic window pops up to allow viewing or interaction with that dataset.

A set of authoring and editing tools will be designed to allow the interactive WYSIWYG creation of HTML+ documents, as well as allowing the embedding of visualizations, etc., which can be created using the interactive remote visualization tools, and which can use data from the various scientific databases mentioned above. Alternatively, the author can use his/her own datasets, which would be uploaded to an Internet-accesible World Wide Web server. The journal editor can use the same set of tools to edit submitted articles and to communicate changes to the text with the author. This, of course, would occur in a private, access-controlled, area of the system, so that confidentiality of the material to be published can be controlled.

Other private, access-controlled HTML+ servers will be used to administer the peer review process. A modification of NCSA's Mosaic-based group annotation server will be developed to allow the jounal editor to exercise precise control and documentation of each reviewer's comments and suggestions.

Contributions:

UCSF CKM:

- Development of Z39.50-compliant experimental (subset) databases for storage of Visible Human data, PDB data, and Genbank sequence data.
- Cooperation with AT&T in the development of an object-oriented SGML-based database for the Handbook of Current Medical Diagnosis and Treatment (CMDT)
- Development of an experimental Z39.50 interface to Medline data (will be unnecessary if UC's DLA can provide such an interface to Melvyl Medline early enough into the project timeline)
- Development of translator servers to translate Medline MARC records, CMDT SGML data and Red Sage SGML/Postscript data into HTML+
- Development of a set of HTML+ documents that act as browsers to Medline, CMDT, and Red Sage
- Refinement and further development of Vis to allow better distribution of computation and better integration with Mosaic.
- Cooperation with CGL to adapt Midas for integration within Mosaic, and to identify and adapt a suitable program for graphical display of genetic sequence data.
- Refinement and further development of the interactive remote visualization server, and its incorporation (with NCSA's help) within the Mosaic environment.
- Development, in cooperation with NCSA, of an enhanced version of the Mosaic client to allow easier integration of external programs within Mosaic-readable documents.
- Development, in cooperation with Springer-Verlag and NCSA, of an interactive WYSIWYG editor for creation of HTML+ documents, and for embedding visualizations created using CKM's IRV tools, as well as development of a modified version of NCSA's group annotation server to support the peer review process.
- Development, in cooperation with AT&T, of an object-oriented SGML-based URC database
- Development, in cooperation with UCSF's CGL, UCSF's Radiology Dept., Washington Univ., and AT&T, of a Semantic domain name server and a URN Thesarus, based upon AT&T's object-oriented SGML database technology.
- Development, in cooperation with UCSF's CGL, UCSF's Radiology Dept., Washington Univ., and Springer-Verlag of a set of sample content for use in evaluating the effectiveness of the system, as well as for demonstration of the results of the project.

UCSF CGL:

- Cooperation with CKM to adapt Midas for integration within Mosaic, and to identify and adapt a suitable program for graphical display of genetic sequence data.
- Contributing to the refinement and further development of the interactive remote visualization server, and its incorporation (with NCSA's help) within the Mosaic environment.

- Development, in cooperation with UCSF's CKM, UCSF's Radiology Dept., Washington Univ., and AT&T, of a Semantic domain name server and a URN Thesarus, based upon AT&T's object-oriented SGML database technology.

- Development, in cooperation with UCSF's CKM, UCSF's Radiology Dept., Washington Univ., and Springer-Verlag of a set of sample content for use in evaluating the effectiveness of the system, as well as for demonstration of the results of the project.

Washington University:

- Development, in cooperation with UCSF's CKM, UCSF's CGL, and AT&T, of a Semantic domain name server and a URN Thesarus, based upon AT&T's object-oriented SGML database technology.

- Development, in cooperation with UCSF's CKM, and UCSF's CGL., and Springer Verlag of a set of sample content for use in evaluating the effectiveness of the system, as well as for demonstration of the results of the project.

AT&T Bell Laboratories:

- Development of Z39.50 interface to the RightPages server..

- Cooperation with CKM in the development of an object-oriented SGML-based database for the Handbook of Current Medical Diagnosis and Treatment (CMDT)

- Development, in cooperation with CKM, of an object-oriented SGML-based URC database

- Development, in cooperation with UCSF's CGL, UCSF's Radiology Dept., Washington Univ., and CKM, of a Semantic domain name server and a URN Thesarus, based upon AT&T's object-oriented SGML database technology.

Springer-Verlag:

- Development, in cooperation with UCSF's CKM and NCSA, of an interactive WYSIWYG editor for creation of HTML+ documents, and for embedding visualizations created using CKM's IRV tools, as well as development of a modified version of NCSA's group annotation server to support the peer review process.

- Development, in cooperation with UCSF's CKM, and UCSF's CGL., and Washington Univ. of a set of sample content for use in evaluating the effectiveness of the system, as well as for demonstration of the results of the project.

NCSA:

- Cooperation with CKM in developing an enhanced version of Mosaic to allow easier integration of a client modeule for CKM's interactive remote visualization server.

- Cooperation with CKM and Springer-Verlag in the modification of NCSA's group annotation server to facilitate the peer-review process.

Personnel:

Co-Investigators:

UCSF:

Library & CKM: Richard Lucier, David Martin, Zoe Stavri, Ph.D., Cheong Ang, Marc Salomon
Radiology: Tom Budinger, Ph.D.
Molecular & developmental Biology: Tom Ferrin, Ph.D., Charles Ordahl, PhD.

Washington University (molecular biology): Toni Kazic, PhD
Bell Laboratories: Ed Szurkowski, Guy Story
Springer Verlag: Bob Badger, PhD
NCSA: Joseph Hardin, PhD, & Mosaic development group
SFSU: Computer Science Dept. MS students

Timetable: 4 years

Budget: 1.2 $M/year

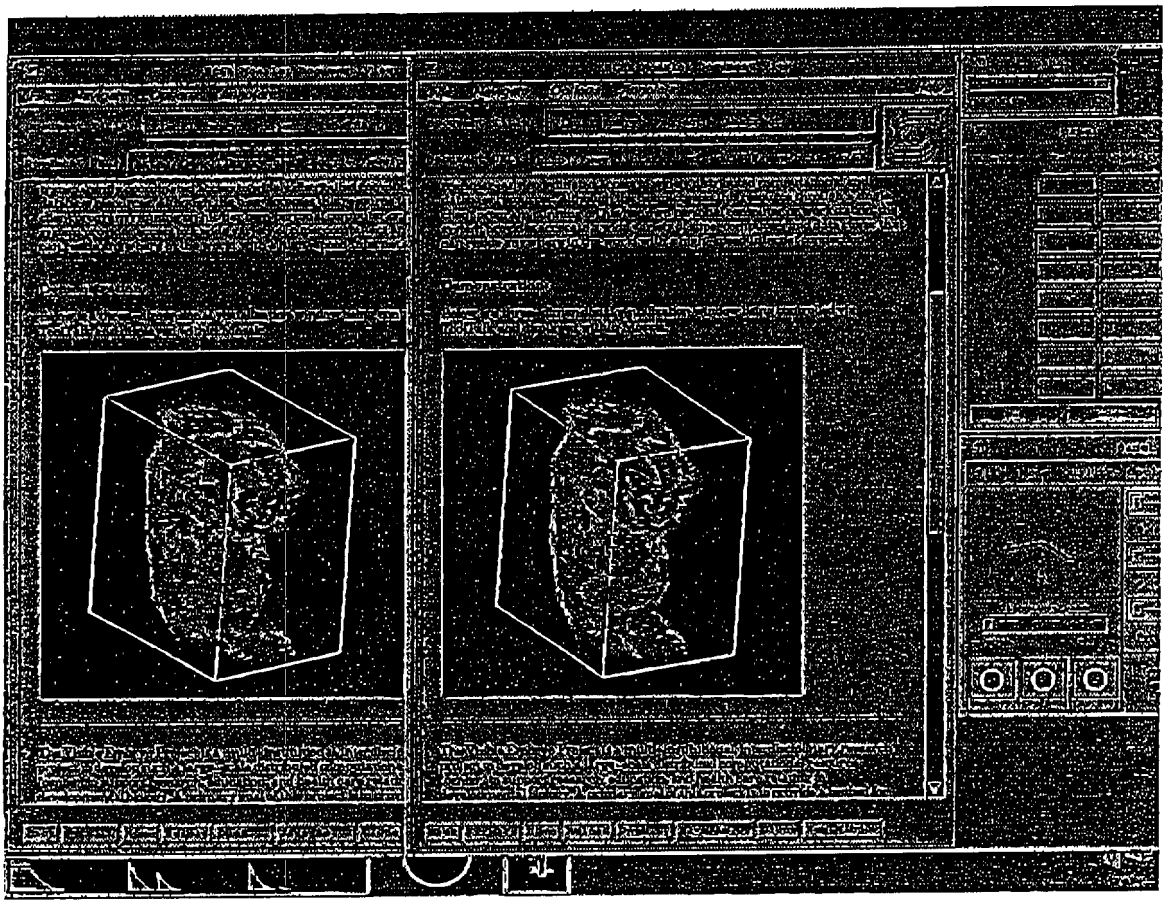


Figure 1: A stereo-pair illustration of interactive real-time 3-dimensional human embryonic volume reconstructions embedded within an NCSA Mosaic document. This technology was developed by the Center for Knowledge Management at the University of California, San Francisco, and was demonstrated there in November, 1993.

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Major work experience

University of Illinois,
Associate Director, Software Development Group, NCSA, 1992-present

University of Illinois,
Manager, Software Development Group, NCSA, 1988-1992
Coordinator, Academic Affiliates Program, NCSA, 1987 -1988
Visiting Research Associate, NCSA, 1986-1987

University of Georgia at Athens,
Visiting Instructor, Department of Speech Communication, 1985-1986

University of Illinois,
Teaching Assistant, Department of Speech Communication, 1979-1985
Teaching Assistant, Department of English-Rhetoric, 1978
Research Assistant, Department of Sociology, 1977-1978

Other work

Consultant -Business computer communications, database management, and office organization, 1982-1985
Consulting Editor/Contributor-The Champaign-Urbana Weekly news magazine, 1981-1982
Editor-The Champaign-Urbana Weekly news magazine, 1979-1980

Recent Grants and Awards

Exploratory Research and Initial Development of Software for the Analysis of Multiple Hybridization Images, 1990-1992
IBM Second Generation RISL Workstation Graphics Capabilities: Jointly Defined Effort, 1990-1992
NCSA Hierarchical Data File Software Capitalization: National Distribution and Support, 1991-1993
Research Education for Undergraduate Students Supplement, 1990-1993
Supercomputers for Biologists: Macromolecular Sequence Analysis through Distributed Computing, 1991-1993
Visualization in the MS DOS Environment: NCSA/Jackson State Collaborative Project, 1990-1993
x3d Program Development, 1992-1993

Education

Study toward Ph.D., Speech Communication, University of Illinois
Study Abroad, University of Cologne, Cologne, West Germany, 1978
B.A., History, University of Illinois, 1972

Selected Recent Conference Papers/Participation

Sigchi, Session Paper, "Scientific Visualization in a Collaborative Environment," Amsterdam, Holland, April, 1993 (in submission)

Sigchi, Session Paper, "Collaborative Hypermedia for Computational Science," Amsterdam, Holland, April, 1993 (in submission)

Oceanographic Institute, Old Dominion University, Invited Seminar, "Recent Developments in Collaboration Technologies," Norfolk, Va., Feb. 1993

Scientific Computing & Automation Conference, Invited Speaker, "Cross platform Digital Conferencing Software Development," Washington, DC, 1992

New York University, Academic Computing Facility, "Scientific Visualization in Collaborative Technologies," New York City, NY, 1992

International Institute of Ecological Economics Conference, Invited Workshop Participant, Beijer Institute, Stockholm, Sweden, 1992

American Educational Research Association Conference, "Collaborative Tools for Scientific Communication and Understanding," San Francisco, CA, 1992

Mac SciTech National Conference'92, "Interpersonal Computing for Computational Scientists: The NCSA Collage Series," San Francisco, CA, 1992